

1. ENVIRONMENT

Common Citizen Concerns

- **Degraded water quality deters active use of the river.**
- **Lack of maritime activities.**
- **Need for greater environmental education focusing on a restored river watershed.**
- **Need for sustainable development that preserves regional natural resources and habitat areas.**

Actions

- **Accelerate cooperative efforts with Maryland** to address existing pollution loads that flow into the Anacostia.
- **Implement Long Term Control Plan** to reduce combined sewer overflows in the Anacostia by 98 percent by 2015.
- **Daylight tributary streams east of the river**, including Watts Branch, Stickfoot Creek, and five others.
- **Create six new wetland areas** in the middle and upper reaches of the Anacostia by 2005.
- **Promote maritime activities**, such as canoeing, rowing and kayaking, to expand people's experience of the river.
- **Create and enhance boat-landing sites**, including new landing sites east of the river.
- **Restore over 300 acres of restored habitat** along the Anacostia shores.
- **Build an interpretive Nature Center** on Kingman Island.
- **Implement low-impact development practices** throughout the watershed.

This section of the Framework Plan charts the path toward vastly improved water quality for the Anacostia. Achieving that goal entails acknowledging the region's role in restoring the watershed, re-establishing natural systems and habitats, and enhancing shoreline and water-based activities. Also vital will be the improvement of river stewardship and the promotion of responsible, low-impact, new development through smart-growth policies and sustainable design.

The Anacostia has for too long been Washington's less-valued river. It has yielded its natural beauty to industrial infrastructure, absorbed too much of the region's surface run-off and pollutants, given its banks over to highway and railroad corridors, and formed a boundary between more- and less-desirable neighborhoods.

Today the Anacostia River is severely polluted and deteriorated. The river suffers from a combination of non-point-source pollution from 176 square miles of urbanized regional watershed, combined sewer overflows (CSOs) from the District of Columbia's antiquated sewer system, and toxins that have settled in the river's sediment. More than 80 percent of the stormwater pollutant load on the Anacostia River originates in Maryland.

Despite decades of abuse and neglect, the banks of the Anacostia contain remarkable assets: great historic neighborhoods and cultural landmarks, opportunities for vital new neighborhoods and economic growth, a significant amount of publicly held land and open space, national destinations such as the National Arboretum and Kenilworth Aquatic Gardens, and areas of remarkable tranquility and natural beauty. Few American cities have better opportunities to re-orient themselves around comparable natural and cultural amenities.

The promise of a great river does run through Washington, but the Anacostia's ecology and natural beauty must be restored to bring people back to its shores. Various restoration initiatives have been in place for almost two decades, involving many government agencies, non-profits, and community groups.

Regional contracts, such as the Anacostia Watershed Restoration Agreement and the Chesapeake Bay Program, have made progress in restoring the watershed's ecosystem but still face challenges in inter-jurisdictional coordination. They also lack binding restoration benchmarks that require environmental cleanup by a certain date. Effective cleanup requires regional prioritization of restoration projects, and an integrated strategy covering the entire watershed.

If urban growth during the 19th and 20th centuries celebrated urban expansion, the 21st century will be about urban conservation. To flourish, Washington must continue to grow, but no longer at the expense of an impoverished natural or social realm. Much of the Framework Plan is dedicated to raising public awareness of the Anacostia's potential and guiding the smart growth of the nation's capital across succeeding generations. A more sustainable approach must govern the ways in which we inhabit and re-inhabit Washington. The joy with which urban residents seek out natural assets such as the Anacostia River reflects a growing recognition of the local ecology's enduring value.

Cleaning, restoring, activating, and protecting the river go hand-in-hand. As more people interact with the Anacostia in their everyday lives, the imperative for environmental healing will grow. A cherished and wisely used urban river is far more likely to become a well-tended river.

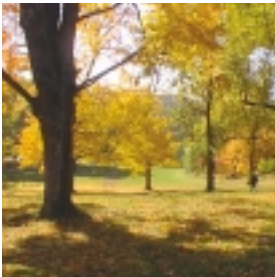
A Clean and Active River

- 23 The Vision
- 24 The Environmental Agenda
- 26 Healing at the Scale of the Watershed
- 30 Restoring Natural Systems: Wetlands and Floodplains
- 32 Restoring Streams, Riparian Buffers, and Wildlife Habitat
- 34 Reducing the Environmental Impact of Development

THE ENVIRONMENTAL AGENDA

The goals of the AWI Environmental Agenda will chart the course for environmental healing and the rejuvenation of water-dependent activities on the Anacostia River. The AWI

seeks to eliminate pollution, control run-off, restore streams and wetlands, and promote water activities.



“ Look at the Anacostia River. We must clean it up! We must make the river that once divided us a symbol of our unity and the engine for a thriving waterfront. Let’s make clean air and clean water a standard for every one of our communities.”

Mayor Anthony A. Williams,
State of the District Address 2001

Water Quality

- Eliminate combined sewer overflows (CSOs) into the river.
- Seek to eliminate pollutant discharges into the watershed, including those originating in Maryland.
- Restore natural riparian functions and expand fringe wetlands along the watershed.
- Explore ways to increase oxygen levels in the water to support flora and fauna.

Air Quality

- Aggressively promote public transit use and reduce automobile emissions.
- Mitigate poor air quality with natural woodland filters.
- Reduce single point-source air pollution.

Toxins Remediation

- Eliminate ongoing sources of toxic pollution entering the river.
- Remediate toxins in the river bed to improve water quality.
- Remediate and redevelop contaminated brownfields.
- Promote best management and bio-engineering of contaminated landfill sites.

Habitat Enhancement

- Bio-engineer the water’s edge to create and restore wildlife habitat along the upper reaches of the river.
- Daylight tributary streams and restore estuary environments.
- Manage the river’s riparian buffers throughout, and introduce native plant species.
- Punish dumping of refuse, and support habitat cleanup.

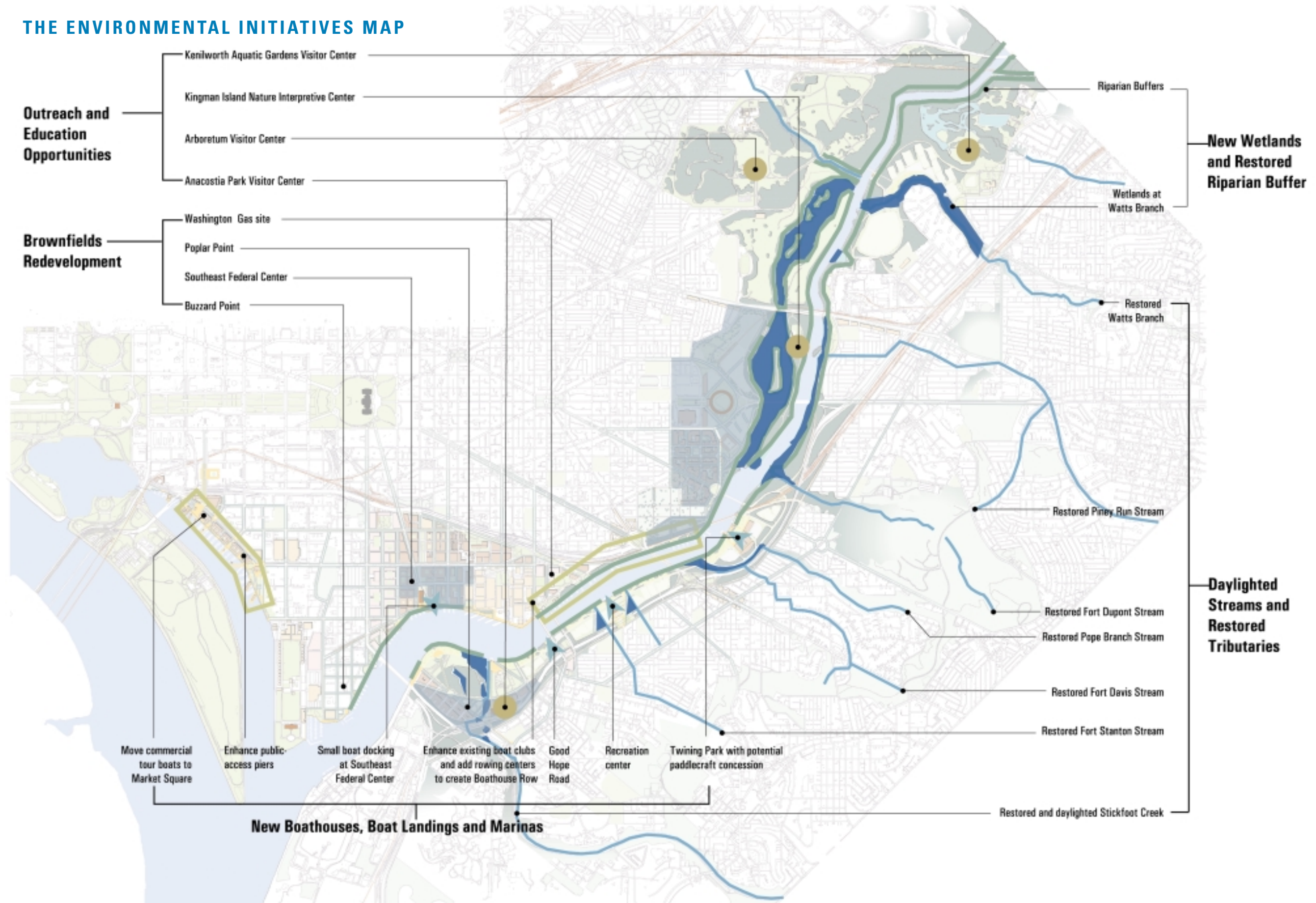
Sustainable Design Practices

- Promote stormwater recycling, retention, and filtration.
- Minimize all impervious surfaces and mitigate the urban heat-island effect.
- Promote “Green Marina” management.
- Introduce sustainable building regulations and incentives during public land disposition.

Outreach and Education

- Integrate and celebrate the environmental history of the Anacostia River along the waterfront.
- Promote education and interpretation centers.
- Promote on-site “living classroom” approaches to learning.
- Promote individual stewardship, explaining how individuals can help keep the river clean.

THE ENVIRONMENTAL INITIATIVES MAP



Healing at the Scale of the Watershed

“For a clean and active river to become a reality, stakeholders must implement the recommendations made by government agencies, and must support the work of environmental and neighborhood groups.”



Anacostia Watershed with Jurisdiction Boundaries

The Anacostia River watershed is approximately 170 square miles. Its network of urban streams crosses many political boundaries. With headwaters in Maryland, the Anacostia's tributaries flow through Montgomery and Prince George's counties before converging and flowing through the District of Columbia and into the Potomac River.

The once-lovely Anacostia has a message for us. With its vestiges of lost beauty and its polluted waters, a silted-in channel and the sickened remains of a once-thriving fish population, it asks us to reconsider the way we build, the way we commute, the way we make things, and the places we make – in short, the way we live.

The silting and pollution of the Anacostia began with colonial farming practices. As population in the watershed and the city of Washington has grown over the centuries, the load of silt and wastes dumped into the Anacostia – human, agricultural, and industrial – has grown too. Today the Anacostia watershed is the most densely populated in the Chesapeake Bay watershed system. As a result, the Anacostia is the most polluted tributary of the Chesapeake Bay.

Although the Anacostia River has historically served as a recreational setting for the surrounding population, the D.C. Department of Health currently warns against swimming in the river, having secondary contact with the water, or eating the river's fish. The Department of Health also observes that the river's low level of oxygen limits its ability to support fish and other aquatic life.

The Problem

The Anacostia watershed spans roughly 170 square miles and includes Maryland's Montgomery and Prince George's counties and Washington, D.C. Most of the watershed – 83 percent – lies in Maryland; over 80 percent of pollutants in the Anacostia originate there.

Most of the pollutants generated in the watershed cannot be traced to specific points. These non-point-source pollutants – including gas, oil, and contaminants that settle on the ground from car exhaust, construction projects, and chemical spills, as well as loose dirt and sand – wash into the Anacostia and its tributary streams with every rain. This process is a consequence of urban development everywhere; vegetated areas absorb rainwater while the building materials and paving of urban development do

not. In urban areas, most rainwater is not absorbed. Instead, it runs over vast expanses of paving into storm sewers and from there to streams and rivers. Over the years, industrial uses have also damaged the river. Toxins from manufacturing and power plants have settled into the river's sediment, where any disturbance re-releases them into the water, further damaging its quality.

Combined Sewer Overflows

Approximately one-third of Washington is served by a combined sewer system. Built in 1871, this system once conveyed both sanitary sewage and stormwater in one piping system to the Potomac and Anacostia Rivers. One hundred years later, the Blue Plains Wastewater Treatment Plant was built to intercept and treat wastewater before it is discharged into the rivers. This system works during dry weather. However, during significant rainfall, stormwater from city streets overwhelms the capacity of the combined sewer system, and the excess flow – a mixture of stormwater and sanitary wastewater called Combined Sewer Overflow (CSO) – is discharged directly into the Anacostia River, the Potomac River, Rock Creek Park, and tributary streams at CSO outfalls.

There are 17 CSO outfalls emptying into the Anacostia River. Over 60 percent of the system's annual combined sewer overflow enters the Anacostia, dumping a total of two billion gallons of dilute wastewater and stormwater into the river. But even when stormwater alone enters the river, it includes an array of urban contaminants from streets and other paved surfaces.

What Is Being Done

Thanks to citizen activism, environmental monitoring and research, and government enforcement, the Anacostia now benefits from the attention and energies of many people, and with good reason. The restoration of the Anacostia is widely seen as key to creating new recreational settings, revitalization projects, and incentives to spur commercial and economic development in neighborhoods along the river.

Montgomery County and Prince George's County in Maryland have both entered agreements to protect portions of the Anacostia watershed. Both counties are part of the Anacostia Watershed Restoration Agreement of 1987. In addition, Maryland is a member of the Chesapeake Bay Program to restore the Chesapeake Bay and its tributaries. (See the figure labeled “Important Environmental Initiatives” on page 28 for a full list of environmental agreements relating to the Anacostia River).

Fixing the Sewer System: WASA's Long-Term Control Plan

The District of Columbia Water and Sewer Authority (WASA) has prepared a Long-Term Control Plan (LTCP) proposing modifications to the combined sewer system. The control measures proposed for the Anacostia River will reduce CSO events (the number of times CSOs are discharged into the river) from 80 each year to two each year. The LTCP for the Anacostia River has four main recommendations:

- 1 Rehabilitate WASA's Main, O Street, and Eastside Pumping Stations .
- 2 Build a storage/conveyance tunnel to intercept CSOs when it rains.
- 3 Consolidate CSO outfalls on the west side of the river near the Anacostia Boathouse Row area.
- 4 Construct a pipeline from Fort Stanton to Poplar Point to address CSO outfalls on the east side of the river.

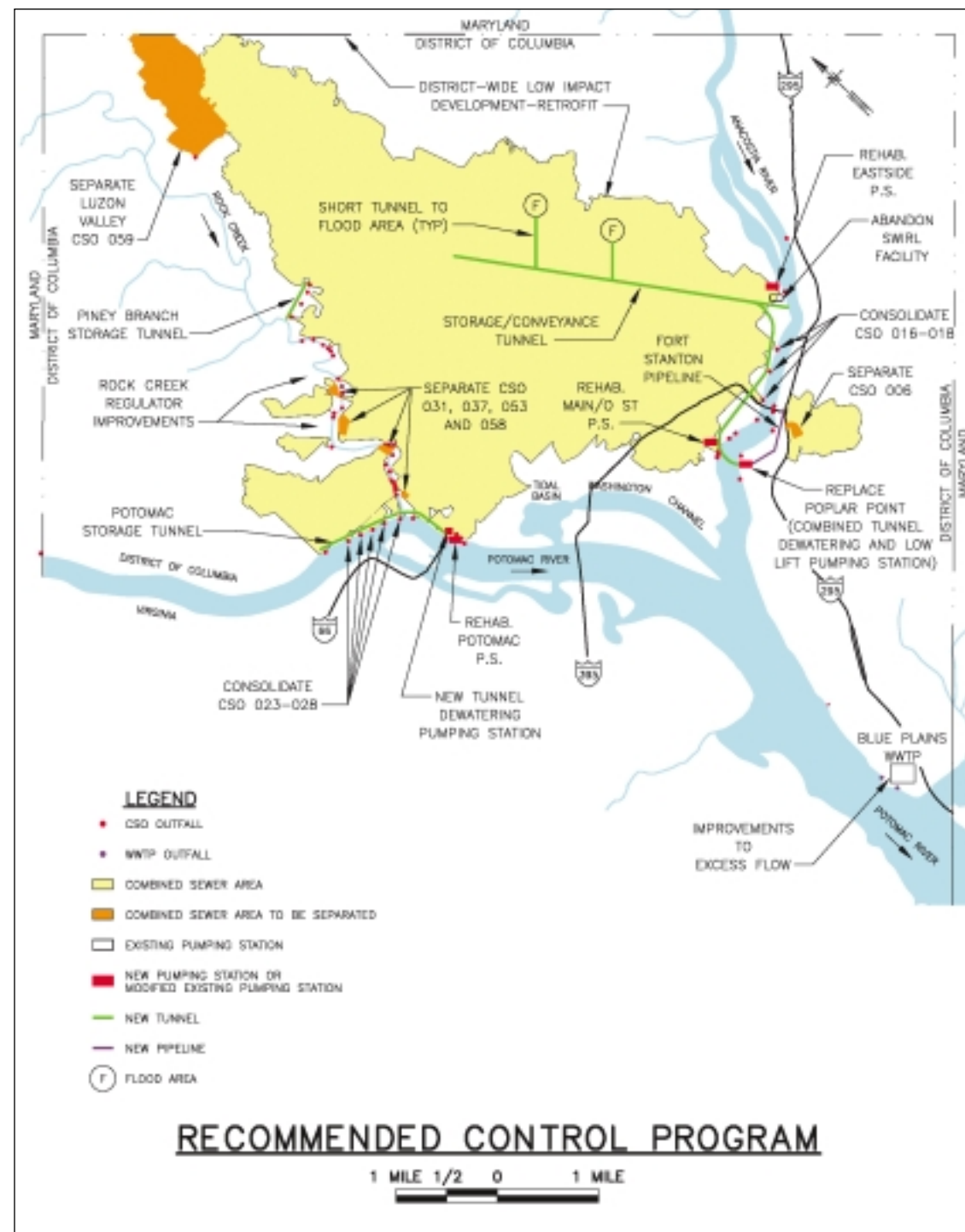
The LTCP also recommends a system-wide Low-Impact Development Retrofit (LID-R) throughout the city. This requires implementing measures at the neighborhood scale that will mitigate stormwater discharge into the river. Retrofitting and rehabilitating the neighborhoods' stormwater infrastructure can be achieved by disconnecting downspouts, planting rain gardens, using pervious paving, and introducing state-of-the-art urban forestry techniques like “green” roofs. WASA has committed to providing technical and regulatory assistance to the District government and will implement LID-R projects on WASA facilities where feasible.

Reducing Runoff and the Contaminants It Carries

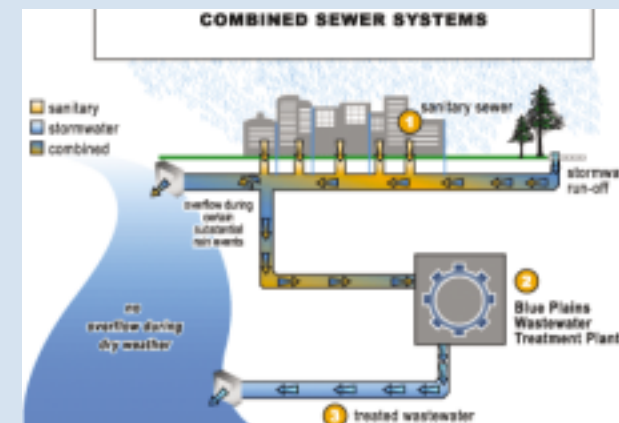
The District Department of Health (DOH) has prepared Total Maximum Daily Load (TMDL) standards for fecal coliform bacteria and other organics, metals, and suspended solids. The Anacostia receives such high daily doses of bacteria, metals, silt, oil, grease, and other pollutants that it cannot meet current Department of Health standards. It will only do so when this daily load of contaminants is reduced through environmental reforms to curb runoff, reduce periodic sewer overflows, and reduce automobile-generated pollution.

With contaminants coming from so many sources, various District government agencies are involved in trying to reduce pollution. Together, they will need to modify transportation systems, adjust construction standards and practices, and plan to retain or absorb rainwater as much as possible on private and public property, as discussed later in this chapter. Many local agencies are also working with state and federal agencies through the Anacostia Watershed Toxics Alliance (AWTA) to evaluate pollution sources and recommend remedies.

New industrial uses along the river are no longer permitted. Some recent non-industrial developments have included exemplary measures. For instance, the \$400 million Navy Yard reconstruction included state-of-the-art, low-impact development, stormwater filter systems, and remediation of residual chemicals. Likewise, the newly renovated Matthew Henson Earth Conservation Center near Buzzard Point has a “green” roof that filters stormwater before it runs into the river.



What is Combined Sewer Overflow (CSO)?



CSO or "Combined Sewer Overflow" is a mixture of stormwater from city streets and untreated sewage wastewater that is released directly into marine waters, lakes and rivers during significant rainfall.

Most sewer systems constructed since 1950 conduct sewage and stormwater separately. Furthermore it has become standard to treat

sewage water before it discharged. However, many cities such as Washington D.C. still have older combined sewers; during heavy or long duration storms, the volume of the stormwater runoff may become too large for the combined sewers to handle, and the overflow which includes sanitary wastewater is released directly into the river.

CSO Long-Term Control Plan Projects

The primary feature of the Water and Sewer Authority plan is the new storage/conveyance tunnel, which would run from the northeast corner of Washington to Poplar Point, collecting rainwater and sewage overflows. This new tunnel would reduce the number of combined sewer overflow events in the Anacostia, from approximately 80 occurrences per year to two occurrences per year, which would be a 92 percent reduction from current volumes. The plan is scheduled to take 30 years to complete, with the Anacostia portions completed in 13.5 years. [Source: WASA Stakeholder Meeting January 24, 2002].

Important Environmental Initiatives

<div>Efforts to restore the Anacostia and its watershed began almost two decades ago. Since that time, more than 60 government agencies, non-profit organizations, and tenacious community groups have created a number of powerful alliances and initiatives dedicated to the river's restoration. Although the river has experienced decades of neglect, the political jurisdictions through which it flows are now cooperating in an effort to bring back the river's once vibrant ecosystems.</div>			
Year	ALLIANCE/ORGANIZATIONS	GOAL	ACHIEVEMENTS
1983 & 1987	Chesapeake Bay Program The State of Virginia The State of Maryland The State of Pennsylvania The District of Columbia The Chesapeake Bay Commission The U.S. Environmental Protection Agency	To restore the waters, habitats, and life of the Chesapeake Bay to the greatest extent possible, and to increase awareness of the bay's fragile ecosystems.	Ongoing monitoring and public awareness programs. Environmental work and public education funded at the county level.
1987-2001	The Anacostia Watershed Restoration Agreement (AWRA) The State of Maryland Montgomery County Prince George's County The District of Columbia The Metropolitan Washington Council of Governments The Interstate Commission on the Potomac River Basin The U.S. Army Corps of Engineers The D.C. Water and Sewer Authority Maryland-National Capital Park and Planning Commission The U.S. Environmental Protection Agency The National Park Service The Department of Agriculture	To restore the Anacostia River and its watershed.	Six-Point Action Plan: a framework to guide a lasting restoration effort. Environmental indicators to track restoration progress. Coordination and implementation of restoration projects throughout the watershed. Special Protection Areas: Upper Paint Branch Anacostia Headwaters Greenway: an existing network of stream valley parks, including Anacostia River tributaries like Beaverdam Creek, Indian Creek, Little Paint Branch, Northeast Branch, Northwest Branch, Paint Branch, and Sligo Creek. (Most of the northern third of Prince George's County).
	The Anacostia Watershed Toxics Alliance	To bring together a variety of local, state, and federal agencies, working in good faith as partners to evaluate the presence, sources, and impacts of chemical contaminants on the Anacostia River.	The Phase 1 Interpretive Summary Report, a baseline ecological and human health risk assessment based on existing data and information.

What Needs to Be Done – Work for Everyone

For a clean and active river to become a reality, stakeholders must implement the many policy recommendations made by government agencies, and must support the work of environmental and neighborhood groups that have tended the river for years. Government agencies, environmental groups, citizen groups, and individuals throughout the Anacostia watershed must actively cooperate. Funding for environmental initiatives must be provided, and incentives must be offered to implement "green" building techniques and low-impact development. Neighborhoods must cooperate in controlling litter and trash, and in using landscaping techniques, rain barrels, and porous paving to retain or absorb stormwater. The common goal: to create better community-wide stewardship of the river's water quality and the corridor's ecological needs.

A clean and active river also requires new ways of living, with less reliance on cars and a regional shift to sustainable modes of transportation like public transit, walking, and cycling. Public transit, bicycle, and pedestrian path systems must be further expanded to help curb auto-generated pollution. Zoning and tax structures can create incentives for transit-oriented development (TOD) – development concentrated around transit stops rather than on new, green sites. Providing housing close to employment centers will also help to cut down commuter-generated pollution and alleviate the notorious congestion of the regional road system.

Reestablishing much of the lost habitat and ecological systems along the river's edge is a fundamental element of the Anacostia Waterfront Initiative's environmental agenda. Environmental restoration is part of the process of providing great parks and natural assets for the neighborhoods around the river and the region.

While revitalizing the Anacostia waterfront will involve new construction and increased numbers of people using the river, developers, planners, and users must all work to mitigate the environmental impact of the revitalization process.

Environmental education, public information campaigns, and technical guidelines will be fundamental in instilling a broad sense of stewardship for the Anacostia River. Such guidelines must cover land use, construction, retrofitting of sewer and stormwater drainage systems, and natural resources management.

A River with Many Owners

The more users the river has, the more caretakers it will have. The proposed initiatives for the Anacostia are aimed at inviting people back to the river by building new parks, expanding recreational activities, improving access to the river, and investing in waterfront neighborhoods. As a great natural resource for the city of Washington, the Anacostia River must be the symbolic centerpiece for revitalizing the neighborhoods along its banks; currently, the river's degraded condition reflects the neglect of these neighborhoods.

Benefits of a Clean River

Improved water quality and restored natural habitats will attract more people to the river. A usable river with an appropriately developed waterfront will increase local pride as people take pleasure in its benefits and amenities: fish for the fishermen, clean water for boaters and swimmers, beautiful settings for walkers, and a rich variety of wildlife for all to discover and enjoy.

Boating

To enliven the Anacostia River, more opportunities for maritime activities must be created. Currently, the lower Anacostia hosts seven marinas and boating clubs, with slips for 600 boats, all on the west side of the river. A small boat ramp exists on the east side, at the northernmost reach of Anacostia Park, just below the CSX trestle. To improve access to the water from the neighborhoods on this side of the river, a full refurbishment of the boat ramp facility is proposed, including a paddle craft boating concession. New boat landings are also proposed at Good Hope Road and at the Recreation Center in Anacostia Park, just north of the 11th Street Bridges.

On the west side of the river, the existing boat clubs and marinas will be enhanced to create a Boathouse Row. Potential new marinas are also envisioned at Buzzard Point. There are no boating facilities in the upper reaches of the Anacostia within the city's boundaries, although there is a marina at Bladensburg, Maryland. The Department of Parks and Recreation is working to create a small boat launch on the eastern edge of Kingman Island. From there, canoeists, kayakers, and paddle boaters can enjoy the river basin's natural habitat and row upstream to Kenilworth Park, the National Arboretum, and points further north in the Anacostia Valley. Due to the more sensitive natural conditions in the upper reaches of the river, motorboats will not be permitted north of the CSX railroad bridge.

Fishing

Fishing in the Anacostia River has been a long-standing and very popular activity for people who live along its banks. Current warnings advise that people not eat catfish, carp, or eel from the Anacostia due to the presence of PCBs in the fish population. Reducing the bioaccumulation of toxins in the fish population is a long-term process, since PCBs not only circulate in the water but also settle in the riverbed sediment. While achieving a river clean enough to support healthy fish is a long-term goal, improved park facilities and increased points of access to the river can provide short-term benefits for recreational anglers.

Swimming

A long-term objective of improving the water quality of the Anacostia River is to make the water clean enough for swimming. As discussed in this chapter, cleaning the Anacostia River is a massive effort that calls for dedicated, multi-jurisdictional participation from the entire Anacostia watershed – encompassing neighborhoods in Washington and Maryland – to curb non-point-source pollution and restore natural systems. A sustained river stewardship effort started today will create a swimmable river for Washington by 2025. While further analysis is necessary to determine the location of swimming beaches, these beaches certainly must be located in multiple areas, on both sides of the river, for all to enjoy.

Environmental Education on the River

The Anacostia River is a natural learning laboratory for children and adults alike. Its ecological history and that of its watershed exemplify the degradation of the natural environment by the incursion of unbridled urban growth. Likewise, the restoration of wetlands, tributary streams, and habitats provides an unparalleled opportunity to learn about natural systems and their function in cleaning the river's polluted waters.

Three existing environmental education programs provide excellent models for creating “living classrooms” where the ongoing cleanup of the Anacostia offers superb firsthand learning experiences:

- The Earth Conservation Corps is a non-profit youth corps committed to reclaiming our nation's most threatened resources: the environment and poor, inner-city youths. At the Matthew Henson Center, a restored pump house on the Anacostia River, members learn about the local ecology and wildlife, and work on all aspects of habitat restoration: removing debris, placing booms to contain combined sewer overflow (CSO), planting trees and gardens, and educating the community about the environment. The ECC has built the first “green” roof in the city and is currently constructing three demonstration segments of the Anacostia Riverwalk and Trail.
- The Anacostia Watershed Society (AWS) is a non-profit group dedicated to restoring and protecting the Anacostia River. It offers a variety of educational programs and events that seek to connect people to the river in a personal manner. These involve river cleanups, tree plantings, river tours by canoe or pontoon boat, and educational slide presentations. Through its Watershed Explorers and River Habitats programs, AWS engages children in environmental education by bringing slide presentations and water testing kits into the classroom and taking students canoeing on the river for more water quality testing and wildlife and habitat discovery.
- The National Park Service runs “Bridging the Watershed,” a summer program at Kenilworth Park aimed at high school students. This program promotes national parks as learning laboratories, adopting a scientific approach to under-

standing the Chesapeake Bay watershed and its problems. Students receive educational activity kits to help them perform environmental research, such as collecting and interpreting data. The rangers at Kenilworth Park have designed their educational programs in coordination with local teachers.

As these programs show, environmental education can serve the goals of social and economic revitalization for the people who live along the river. Environmental education can be combined with job training to help broaden young people's exposure to different fields of learning and future employment possibilities, just as environmental programs can be combined with recreation.

In addition to the above benefits, educational programs associated with the river serve less tangible goals. They draw people to the river, introduce them to its potential, and involve them in its stewardship. Educational programs can give Washingtonians a sense of ownership and pride in this valuable local resource – provided the educational opportunities are part of other ongoing improvements to the waterfront area and surrounding neighborhoods.

Such river-based education programs offer inspiration for further development by non-profits and public agencies, such as the National Park Service and the District Department of Parks and Recreation. They are likely candidates to develop park-based programs as public lands along the river are developed. In addition, they can create educational or interpretive exhibits on ecology to communicate the cultural heritage of the Anacostia waterfront and its neighborhoods. For further discussion of opportunities for cultural heritage programs, please see Chapter Four: Cultural Destinations and Places of Distinct Character.

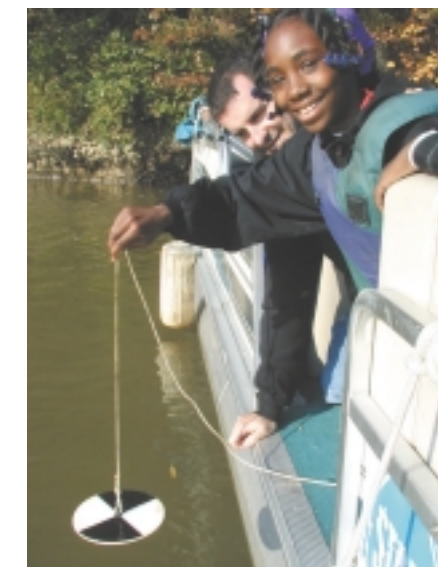
The Living Classroom



Birdwatching at Kingman Island.



Participants in the Anacostia Watershed Society's “Day on the River”.



Students test the Anacostia's water quality in one of the Anacostia Watershed Society's educational programs.

Restoring Natural Systems: Wetlands and Floodplains

“Approximately 90 percent of land in the Anacostia’s flood plain is parkland or open space.”

Restoration Projects Underway

The D.C. Department of Health, working with the U.S. Army Corps of Engineers and the National Park Service, is implementing a variety of restoration projects in the Anacostia watershed.

Kingman Lake

The U.S. Army Corps of Engineers, the National Park Service and the District of Columbia have partnered to restore more than 40 acres of tidal wetland around Kingman Island. This project includes modifying a section of the seawall to facilitate voluntary growth of emergent tidal wetlands.

Pope Branch Restoration

The U.S. Army Corps of Engineers, in partnership with the District of Columbia Department of Health and the National Park Service, is developing a restoration plan for Pope Branch and the lower end of Anacostia Park. Today, the downstream end of Pope Branch runs through a concrete pipe underneath Anacostia Park, and this situation inhibits fish access to the upstream reaches. The Corps is exploring daylighting opportunities for this portion of the tributary, while restoring upper sections of the creek. The project will be designed to provide fish and wildlife habitat without affecting the recreational uses of the park. In addition to daylighting the stream, project elements include adding wetlands and riparian buffers, and upstream stabilization.
(<http://www.nab.usace.army.mil/projects/WashingtonDC/LowerAnacostia/brief.htm>).

Poplar Point Cleanup

The District of Columbia is working with the National Park Service and the National Oceanic and Atmospheric Administration to help investigate contaminants on Poplar Point and restore this prominent waterfront site on the eastern bank of the Anacostia River. Plans also include restoring on-site wetlands and partially daylighting Stickfoot Creek. This activity will involve a multi-year partnership with the District.

Watts Branch Cleanup

The grassroots organization Washington Parks and People, in partnership with the District Department of Parks and Recreation, has spearheaded an ongoing initiative with the District Department of Health to restore the water quality of Watts Branch Creek in northeast Washington.

The habitats of the Anacostia watershed have changed dramatically in the past three centuries. Until the mid-17th century, the Anacostia watershed was a focus for Native American life, and its waters contained such fish species as sturgeon, American and hickory shad, white and yellow perch, redbreast sunfish, pickerel, catfish, and herring. Forests full of wildlife dominated the landscape. But with the arrival of European settlers and the intensification of agriculture in the region, the Anacostia and its streams began to erode, and fill with silt and pollutants.

The 20th century saw the greatest changes to the river and watershed, as local population and development increased dramatically. Intense urbanization resulted in the ongoing loss of forest and wetland habitat, stream alterations, increased pollution, and discharges of combined sewer overflow and industrial waste. The shape of the Anacostia also changed dramatically. Between 1902 and 1926, the Army Corps of Engineers dredged the river bottom, filled and eradicated most of the river’s remaining fringe wetlands, and radically transformed the river’s edge by constructing seawalls.

Today, approximately 70 percent of the watershed has been developed, and only about 25 percent of the original forest cover remains. The environmental healing of the Anacostia watershed will reestablish natural systems to reduce the effects of sedimentation, erosion, and runoff on the river’s water quality and will restore habitats along the river to support plants and wildlife.

Restoring Soils and River Sediments

The Anacostia River acts like a tidal lake, trapping approximately 85 percent of incoming sediment. This helps explain why, by the end of the 19th century, the river had become impassable to all but small boats.

The sediments that have accumulated over the centuries have absorbed many of the contaminants that have entered the river. Sediment toxicity poses a difficult long-term restoration challenge, as sediments are continually re-released into the water, especially when disturbed. Sediments in the river and the watershed have absorbed PCBs, PAHs, lead and other trace elements, and pesticides. Although these sediments can be found throughout the river, the largest concentrations are on the lower half, below Kingman Lake.

Sediment has also spoiled tributary stream habitats. Fine sediments such as sand, silt, and clay accelerate stream bank erosion and cloud water for sight feeders, or clog and irritate the exposed gills of certain species.

The restoration process typically includes dredging to remove the sediment, capping the sediment to isolate contaminants, or monitoring contaminants as they naturally weaken over time. In addition to these traditional approaches, restoration measures can address the contamination through new technologies that destroy organic contaminants or inject oxidants into the contaminated area to enhance bioremediation.

Protecting the Flood Plain, Managing the Seawall

The flood plain – the area covered by periodic natural flooding of the Anacostia – is a natural part of the river habitat. Fortunately, most of the Anacostia’s flood plain is in parklands. Of the total 2,800-acre AWI project area, about 20 percent is located in the 100-year flood plain. Another 10 percent of the land is located in either the 500-year flood plain or in the 100-year flood plain that is protected by a levee. Approximately 90 percent of the land in the flood plain is parkland or open space. The remaining 10 percent is in residential, mixed development, or commercial and industrial

uses, which require protection from flooding. A flood protection levee on the east bank of the Anacostia River – earth in places, concrete in others – extends almost two miles north from Poplar Point to the southwest corner of the Naval District of Washington Anacostia Annex.

Within the AWI project area, a seawall stabilizes both the west and east banks of the Anacostia River. Conditions of the seawall vary: some portions are deteriorating due to vegetation growth, age, soil erosion, and leaking stormwater systems. Sections are currently being replaced. In parklands where streams are being daylighted, portions of the seawall where tributary streams enter the river will be replaced by vegetation to stabilize the river’s edge. Marshes will be created to help contain stormwater and absorb pollutants before they reach the river. Where a seawall is not required, the restoration of the Anacostia requires various interventions to recreate the river’s edge habitat and control runoff.

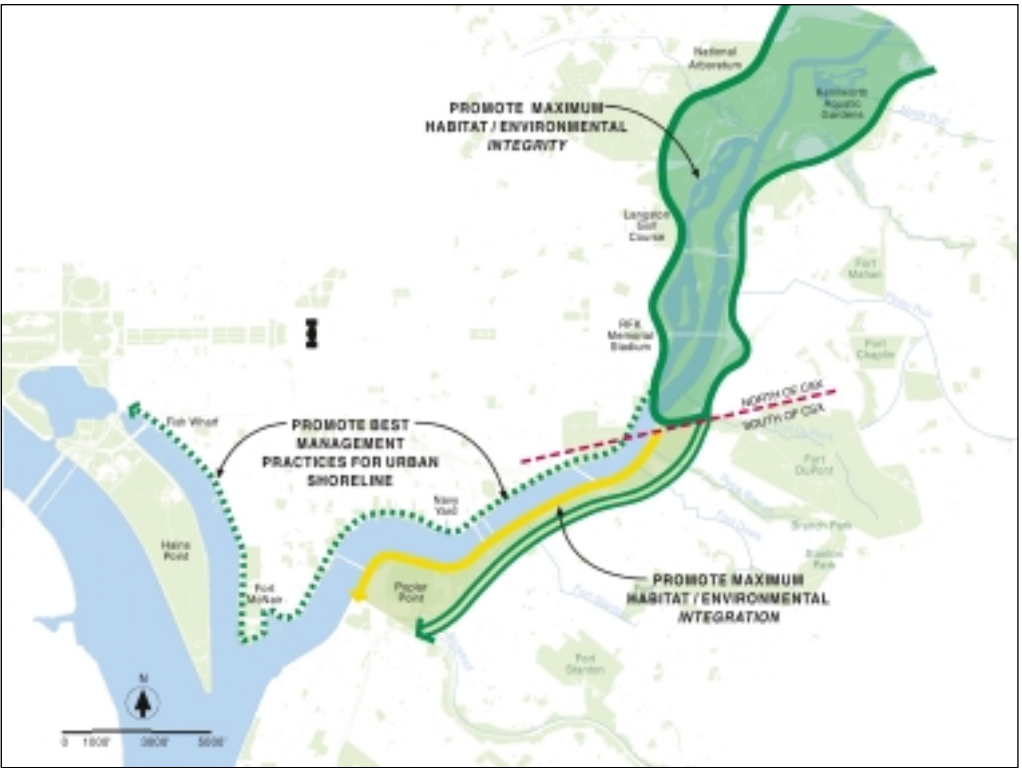
Continued monitoring of the seawalls will be necessary to protect the developed portion of the flood plain. Any redevelopment located in the 100-year floodplain will need to comply with the District’s Flood Hazard Rules.



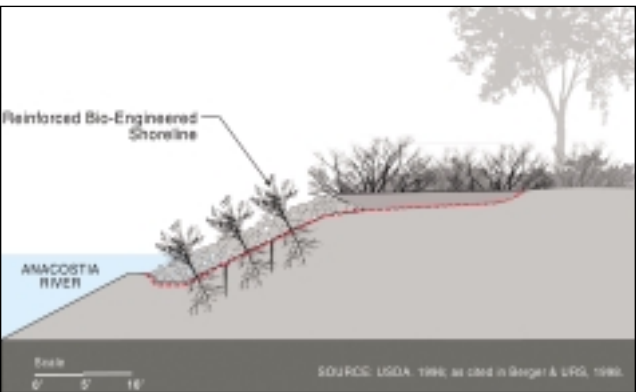
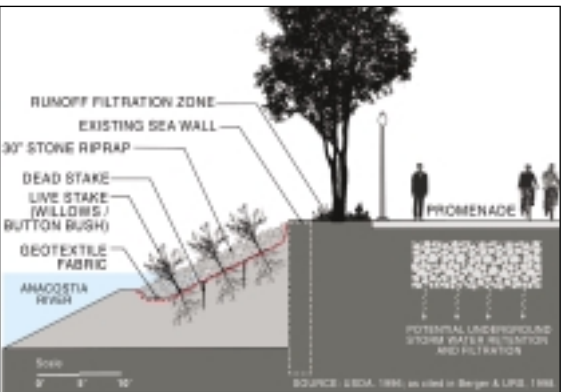
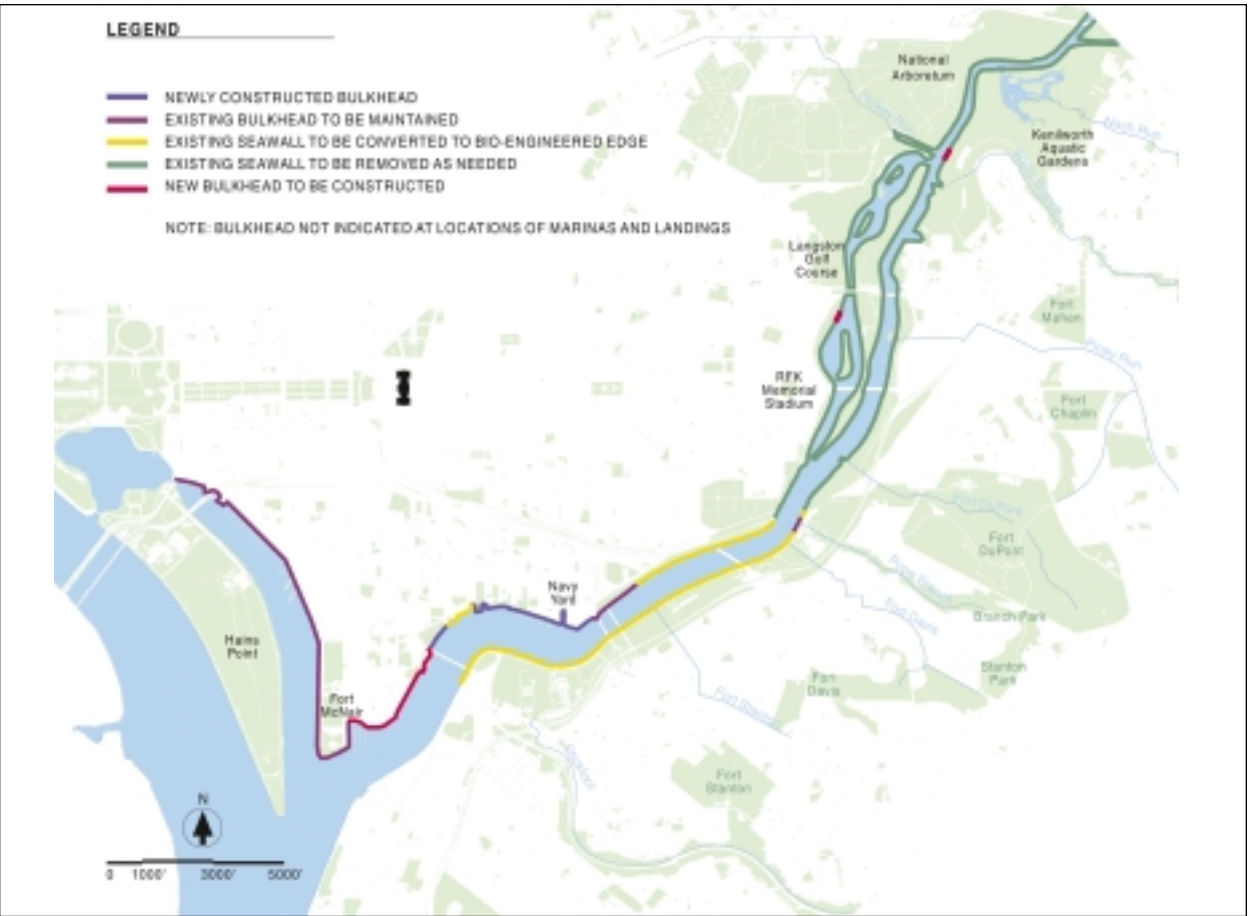
Wildlife of the Anacostia



The Anacostia hosts many species, including the great blue heron, the bald eagle, the large mouth bass, and the red sea hawk.



A Range of Strategies to Address Differing Environmental and Habitat Conditions



Proposed River Edges

Some portions of the seawall (left, on facing page) are deteriorating due to vegetative growth, age, and soil erosion. In the more “urban” basins of the Anacostia, a bio-engineered edge (left) that would build an environmental buffer off the existing bulkhead along the river is proposed. In the upper reaches of the river, a soft edge (right) will be maintained.

Restoring Streams, Riparian Buffers, and Wildlife Habitat

"Three goals of the AWI environmental agenda will benefit wildlife: cleaner water; naturalized edges with native plants; and contiguous green parks that add up to a larger territorial range for animals."

Urban development has destroyed approximately 2,500 acres of tidal marshes along the Anacostia River between Bladensburg and the Potomac River, according to U.S. Army Corps of Engineers (USACE) estimates. Today, fewer than 100 acres of marshes remain, indicating a loss of more than 90 percent of the original tidal wetlands.

The destruction of the Anacostia's tidal marshes has contributed heavily to the river's degradation. The loss of wetlands and the underground piping of streams allows untreated urban stormwater runoff to enter the Anacostia River directly. The AWI proposes restorative new treatments of the river's edges as follows.

Reducing Runoff

The diagram, “Location and Type of Riparian Buffers,” on page 33 shows the new bio-engineered edge that will help contain and filter stormwater along developed areas of the waterfront. This edge includes underground stormwater holding areas plus two types of landscaping along the water’s edge to catch and filter runoff.

New Stormwater Wetlands

In less developed areas, manmade stormwater wetlands will be created. These wetlands will be designed and constructed to mitigate the impacts of urban stormwater runoff. They will work by temporarily storing runoff in shallow pools where wetland plants can thrive, slowing and filtering runoff. This process removes sediments and pollutants, such as phosphorus, trace metal, and hydrocarbons; organic matter that contributes to biological oxygen demand (BOD); oil and grease from impervious surfaces; and bacteria. Stormwater wetlands, properly landscaped and maintained, also contribute aesthetically to a natural, park-like setting (Schueler 1987 and Shaver 1992).

Although stormwater wetlands help manage runoff, they occupy more land than alternative methods. The table labeled “Estimated Stormwater Wetland Size” shows the land area required for the construction of stormwater wet-

lands along each of the six tributary streams that empty into the Anacostia from its eastern bank. Calculations were based on: **1.** area of tributary watershed; **2.** percentage of impervious surface in the watershed; **3.** average pool depth; and **4.** surface-area-to-drainage ratio for desired pollutant removal.

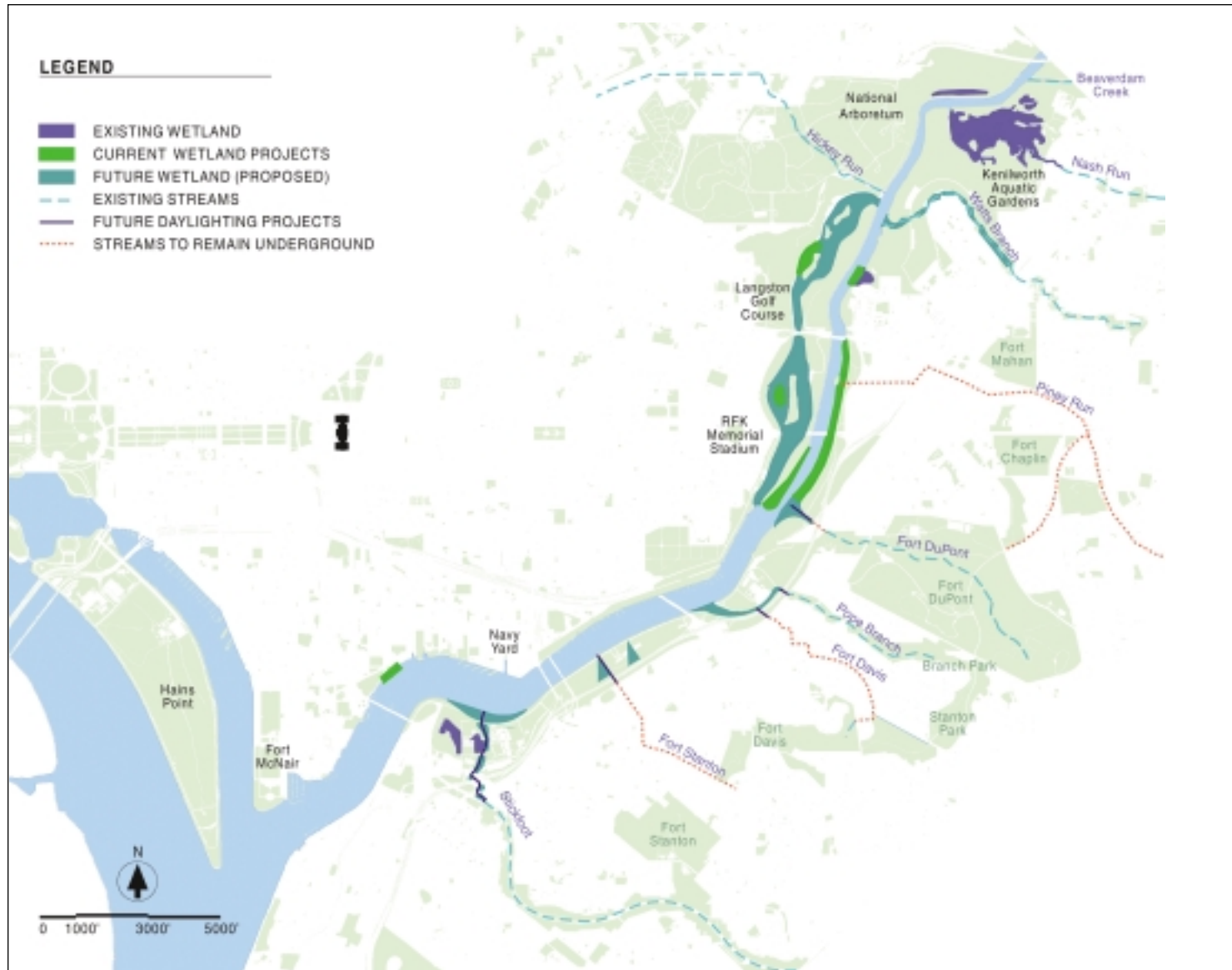
Daylighting of Streams

Part of the process of restoring an urban watershed such as the Anacostia involves rebuilding or recreating damaged tributary streams. Daylighting is the process of taking a river, stream, or stormwater drainage route out of buried pipes and integrating it into the landscape.

Daylighting of streams offers several environmental benefits. It improves water quality, expands stream channel capacity, and expands wildlife habitat. Open streams can slow runoff, and reduce flooding and erosion downstream. Daylighting improves water quality by exposing water to air, sunlight, vegetation, and soil, all of which help to transform or neutralize pollutants. Open streams make possible the recreation of a riparian habitat where the stream meets the river. They also benefit neighborhood residents by creating natural areas and enhancing public spaces.

The Anacostia Waterfront Initiative includes plans to daylight streams wherever practical. The USACE is currently working with the D.C. Department of Health to develop a restoration plan for Pope Branch and Fort Dupont, which lie near each other on the eastern side of the river. Both streams are to be partially restored and opened to daylight in 2003. The Watts Branch has been daylighted already, and plans are underway to restore its water quality.

d, Research continues on the possibilities of daylighting other streams such as the Stickfoot, which will become a central feature of the new Poplar Point Park. Obstacles include issues of ownership, maintenance, and liability, and potential technical problems with the type of soils, the minimal topography, and current land uses. However, these challenges are being explored through the planning process.



Creating New Wetlands and Daylighting Streams

Area Name	Area (ac)	% Impervious	Average Pool Depth (ft)	SA/DA Ratio*	Estimated Surface Area
Fort Dupont	432	18.9	3	0.97	4.2
Watts Branch	2,405	29.0	3	1.34	32.2
Stickfoot	670	44.5	3	1.73	11.6
Fort Stanton	252	43.1	3	1.73	4.4
Fort Davis	235	31.4	3	1.34	3.2
Pope Branch	240	30.3	3	1.34	3.2

*Recommended SA/DA Ratio for Permanent Pool Sizing for 85 percent Pollutant Removal Efficiency in the Piedmont.

Estimated Stormwater Wetland Size

This table shows the land area required for the construction of stormwater wetlands along each of the six tributary streams that empty into the Anacostia from its eastern bank.

Enhancing Wildlife Habitat

Despite its poor water quality, the Anacostia River and parklands provide important habitat for an impressive array of wildlife. Bird species are found on open water and throughout wetlands, scrub, fields, woodland, and urban environments. These include rare and majestic birds, such as the great blue heron, great egret, bald eagle, red-bellied woodpecker, willow flycatcher, red-tailed hawk, and song sparrow, in addition to the normal array of city dwellers, such as the American robin, house sparrow, blue jay, and Northern mockingbird.

Parts of the riverbanks also support beavers, river otters, mink, and red and gray foxes, plus mammals adapted to city life, such as raccoons and squirrels. Amphibian fauna include the spotted salamander, Eastern painted turtle, bullfrog, and black rat snake. Anadromous fish species (fish that move up-river for breeding) such as blue-back herring and white perch live in the river, in addition to freshwater species like largemouth bass, brown bullheads, spottailed shiners, banded killifish, and catfish.

Three goals of the AWI environmental agenda will benefit wildlife: cleaner water; naturalized edges with native plants; and contiguous green parks that add up to a larger territorial range for animals.

Additional measures are aimed specifically to protect wildlife. In the naturalized portions of the river above the CSX railroad crossing, where the majority of wildlife lives, the Framework Plan proposes the creation of a 300-foot continuous riparian buffer, a combination of woodland and wetland. Designed by the scientific community to approximate the natural habitat and needs of river-related fauna, such a buffer will also help filter storm runoff, retain sediment, mitigate flood impacts, and stabilize the riverbanks.

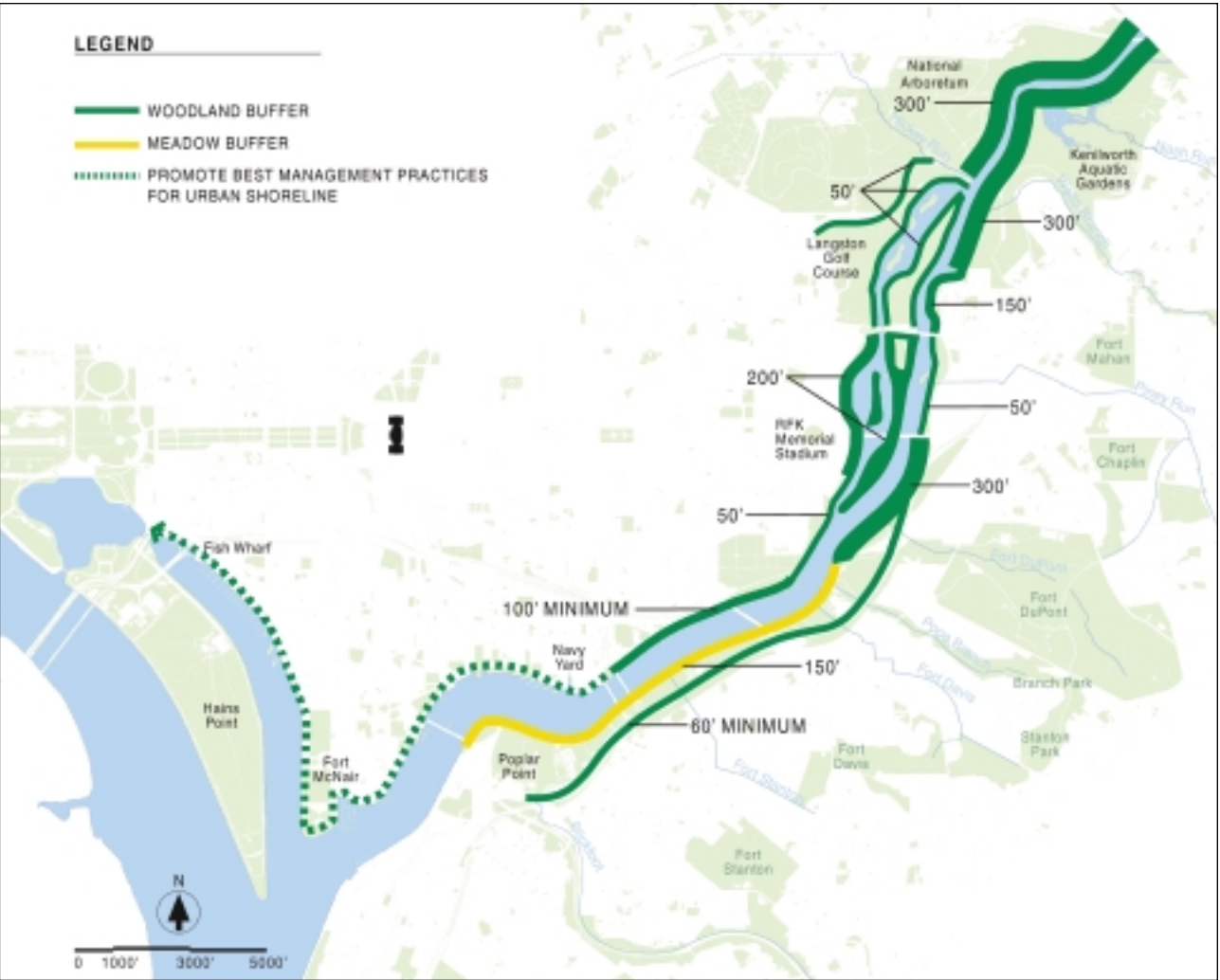
As the natural systems of the Anacostia reach the river's heavily developed lower banks, the design of green spaces should acknowledge the importance of continuous patches of habitat for wildlife. Wildlife is known to fare better when small green areas are joined to form a larger habitat system through which birds and animals can move.

To enhance the ecological health of the lower eastern bank of the river, including Anacostia Park, the Framework Plan proposes, wherever possible, a twofold approach: the creation of a continuous, 150-foot minimum, managed meadow along the shore, and a 60-foot minimum, woodland buffer against the Anacostia Freeway.

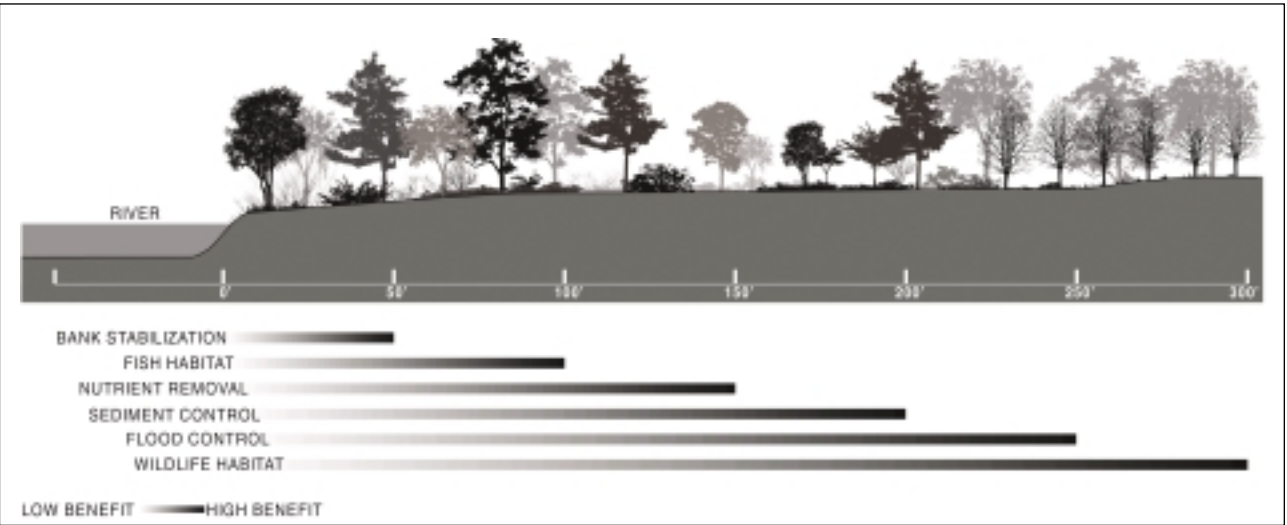
Wooded and/or wetland links along daylighted tributary streams and bridge crossings will be part of a network of wildlife corridors. The forest buffers between the river and the Anacostia Freeway may be periodically interrupted to address concerns about pedestrian safety or to provide views to the water, but the proposed 60-foot buffer is optimal. In the same area, a natural shoreline can be restored, preserving the existing bulkhead only where necessary for boat docking, viewing, fishing, and interpretive exhibits.

The urbanized western bank of the river, downstream from the CSX railroad crossing, features marinas and boat clubs, the Navy Yard docks, and the bulkheads associated with the Southeast Federal Center and Buzzard Point. A bio-engineered shoreline can be created along approximately 10 percent of this area, but is proposed wherever possible to achieve the Anacostia waterfront's environmental goals.

The bio-engineered edge will consist of willows and/or buttonbush embedded in a stabilized, sloping bank, forward of existing bulkheads or, in their absence, behind approved bulkhead lines. Preliminary hydrologic modeling (HEC II) will help to ensure that any proposed shoreline modifications do not raise flooding hazards and that such modifications can withstand the sometimes flashy flows of the Anacostia River.



Location and Type of Riparian Buffers



Woodland Riparian Buffer

Recommended depth of buffer for various levels of environmental protection and habitat types.
Source: Connecticut River Joint Commission.

Reducing the Environmental Impact of Development

“All consideration of automobile transportation in Washington should mitigate the system of high-speed access through neighborhoods that encourages regional through-traffic and automobile use at the expense of neighborhood air quality.”

Green Site Design Techniques



Two examples of how a bio-swale catches and filters rainwater around a building, while also functioning as a beautifully designed landscape.

In order to restore the Anacostia River, Washington must become a leader in the use of environmentally sensitive building techniques. Redesign and reconstruction of the combined sewer/storm drain system will help reduce the load of bacteria in the river, but many other pollutants and kinds of silt will continue to wash into the Anacostia unless those who use it act responsibly and with vision. Any redesign will need to reduce the runoff that currently flows from the watershed into the Anacostia, and the pollutants carried by the runoff.

To effect these reductions, planners and developers will have to reconsider paving and runoff strategies on public and private lands, use landscaping more effectively to absorb rainwater and some pollutants, apply “green” standards to new construction, and address the regional transportation burden.

Development Practices That Minimize Runoff

New development must retain and filter runoff on-site, or route stormwater to green swales or filtering wetlands in adjacent parkland. Filtering wetlands can be designed as attractive and functional water features, so-called “living fountains” that enliven public areas and provide recreational amenities. Poplar Point, Buzzard Point, the RFK Stadium area, and the new parks in the Southwest and Near Southeast are candidate sites for such features. Other building features, such as vegetated or “green” roofs, rain gardens, and porous paving in parking areas, can also help minimize stormwater runoff.

With these and other innovations in mind, a study is currently underway to retrofit RFK Stadium’s vast north parking area in order to minimize the runoff into Kingman Lake and the river as a whole. In the Southwest and Near Southeast, where the location and density of the development preempt surface-water treatment, the use of localized, below-grade storm retention and filtration systems is an option. Using the proposed waterfront promenades for this purpose should be con-

sidered in these areas, where perforated pipes running the length of the promenades can collect, store, and filter runoff.

“Green” design and development standards will govern the construction of new buildings, roadways, parking lots, parks, buffers, marinas, and landscaping of all kinds. The process of construction itself must also be governed by sustainable standards. Through new regulations and incentives, construction processes will be encouraged to be more sensitive to the waterfront environment. Private property owners all along the watershed should also be encouraged to install rain barrels and porous paving to handle stormwater at the neighborhood scale.

Environmentally Sensitive Landscape Planting

Within urban areas, plantings can significantly improve the local microclimate, including conditions such as reflected light, airborne dust, and overall temperature. Deciduous trees, in particular, can reduce energy consumption by providing shade during the heat of summer while allowing sun to shine through in the winter. In addition, certain trees have the capacity to absorb particular toxins, such as lead.

Many plantings can be provided in the public realm, along sidewalks, in green buffers, and in parks. More can be provided in setbacks and easements exacted from private developments. In general, the following practices will be helpful.

- A street-tree program for all thoroughfares within the study area.
- Yards planted with trees, shrubs, and ground covers, especially on the south and west sides of buildings where heat gain can be substantial.
- High-reflectivity paving materials, such as brick or concrete, used throughout.
- Green roofs to help mitigate the albedo effect, (the extent to which a surface reflects back the sun’s energy) and to absorb rainwater.

- Planted buffers along major highways to help mitigate traffic noise and absorb toxic emissions
- Significant woodland buffers along both sides of the Anacostia Freeway, including all interchange areas
- Use of vegetation to stabilize erosion-prone slopes

Existing tree cover should be conserved wherever possible. New development should conserve natural areas and restore damaged areas to provide habitat, promote biodiversity, benefit wildlife, and create the microclimate advantages described above. Development should reduce footprints by stacking floorplates where possible to reduce environmental damage, and replanting the site.

Sustainable Development

A significant increase in housing, such as the 10,000 to 20,000 residential units envisioned in this plan, will reduce commuting loads on regional highways by allowing more people to live near Washington’s large federal employment base. This will reduce both auto-generated pollution and the need for new roadways.

In addition, new development in Washington must be well served by transit. The eight existing Metro stations that currently serve the waterfront present a great opportunity to begin implementing the District’s Transit Oriented Development (TOD) policy. For example, mixed-use development is proposed along the entire waterfront, including the portion of Howard Road that connects Historic Anacostia to Poplar Point. People living in this development will enjoy a short walk to the Anacostia Metro station, new water transit, a light-rail service, and the Anacostia Riverwalk and Trail.

Mixed-use, mixed-income neighborhoods contribute to sustainable development because they allow people with a range of employment prospects to live near a range of jobs, and they offer residents a selection of services and amenities within a short distance. For example, a neighborhood might include retail stores, housing, and recreational opportunities. These mixed amenities serve not only neighborhood

residents, but also employees of neighborhood businesses, who can shop before heading home. In turn, this shopping contributes to the neighborhood's economic development and spreads the commute home over a longer period, reducing congestion and associated pollution. Mixing uses also allows for the sharing of parking resources, reducing the amount of land allotted to cars.

With the Anacostia Riverwalk and Trail, people living or working in neighborhoods along the river will enjoy the option of commuting by bicycle or on foot. The new pedestrian and bicycle paths associated with the Riverwalk will connect to bike lanes throughout the city and other trail systems in the region. Accommodating these alternative modes of transportation can go a long way to improving the quality of life of neighborhoods. For example, bike parking and storage should be provided at transit stations and along commercial corridors. Larger business tenants, or developers building over 100,000 square feet, should provide showers and bike storage facilities for up to five percent of employees or occupants.

Finally, no new industrial uses will be permitted near the river. Existing waterfront industries must establish plans to coexist with new neighbors and waterfront uses.

Building to Save the Environment

The concept of “green” building standards is gaining wide acceptance. The Leadership in Energy and Environmental Design (LEED) rating system, established by the Green Building Council, outlines development practices that conserve energy, water, and other natural resources. LEED recognizes both the pollution created during construction of a building and the long-term pollution resulting from the building’s lighting, heating, and cooling needs. The LEED system will be used to evaluate future developments along the waterfront and should be applied throughout Washington and the Anacostia watershed.

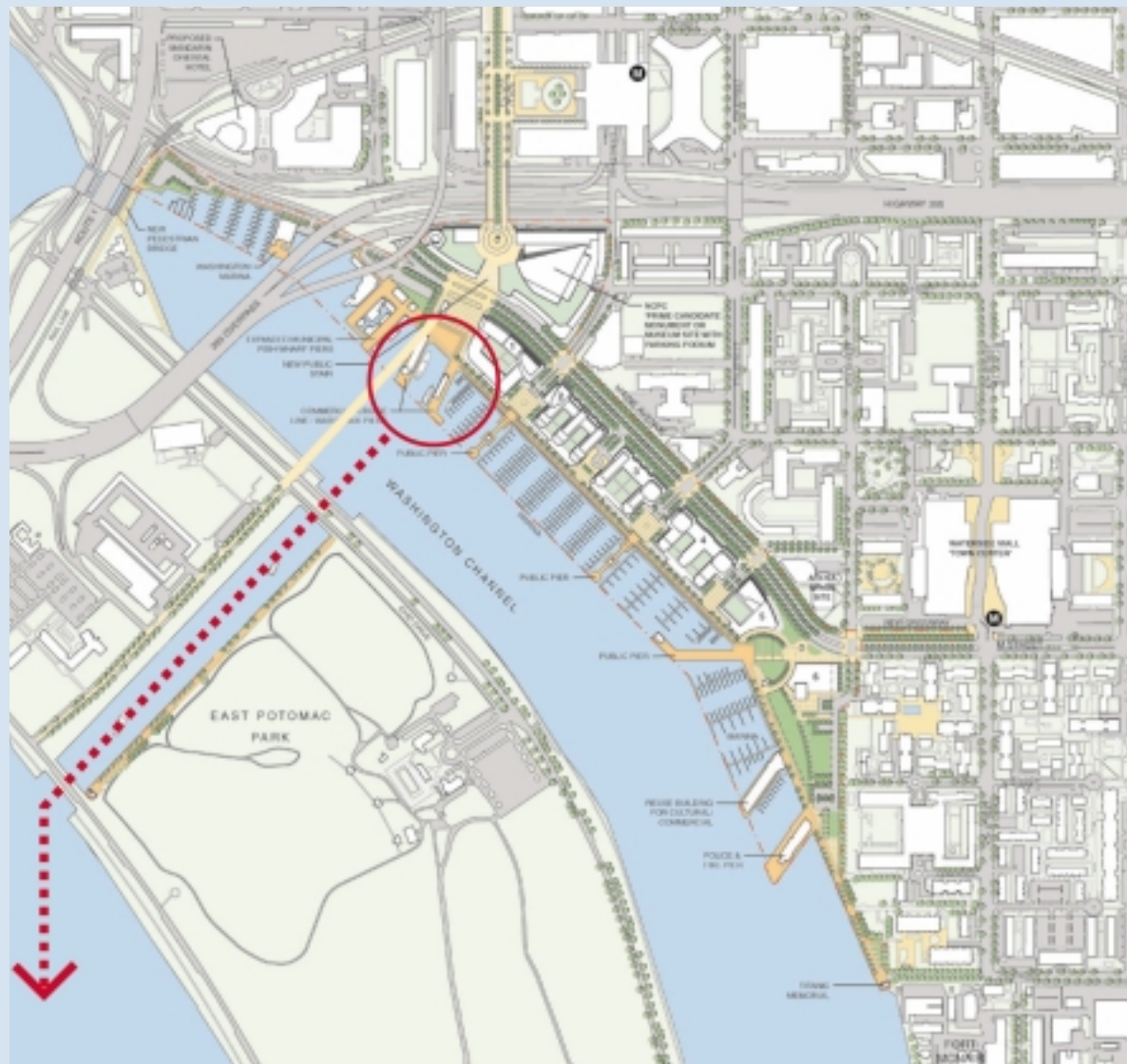
In addition to using porous paving, new developments should provide shade on at least 30 percent of non-roof impervious surfaces within five years. Alternative strategies to reduce heat buildup include the use of light-colored, high-albedo paving materials for at least 30 percent of paved areas. Some parking areas with sufficient drainage might be able to use an open-grid pavement system on some or all of the paved areas to reduce runoff and heat buildup.

Within 500 feet of the river, buildings, roads, and parking areas should strive to reduce light pollution that will interfere with nocturnal wildlife or the diurnal rhythms of trees and other plants. Methods include not exceeding footcandle (appropriate lighting level) recommendations set by the Engineering Society of North America (IESNA) in their Recommended Practice Manual. Fixtures should be designed to keep light from spilling into undeveloped parklands and wildlife habitats. In areas immediately adjacent to wild or wetland zones, decorative architectural lighting should be avoided.

Sustainable Transportation

This plan seeks to meet any potential increases in transportation demand associated with waterfront development through the expansion of public transit and alternative modes of transportation, including light rail, buses, water transit, cycling, and walking. The creation of pedestrian and transit-oriented developments should contribute to the success of public transit – both existing and future. All consideration of automobile transportation in Washington should mitigate the system of high-speed access through local neighborhoods that encourages regional through-traffic and automobile use at the expense of neighborhood air quality. Other modes of transit, such as walking, biking, and public transit – including ferries – are outlined in Chapter Two of this report. In essence, the AWI Riverwalk is intended to serve as a model of an alternative transportation system.

What If... A Canal Bisected East Potomac Park?



What if a canal flowed through East Potomac Park, connecting the Southwest marina to the Potomac River?

The large tour boats currently at the southern end of the Washington Channel could be relocated closer to the Fish Market, the National Mall, and L'Enfant Plaza. Here they would have

direct access to the Potomac and Anacostia Rivers, without disturbing the no-wake zone of smaller marinas or new housing along the southern stretch of the Washington Channel.

Today, a range of boats uses the Washington Channel and marinas. The new plan for the Southwest waterfront proposes new marina

space to accommodate smaller craft at the M Street terminus. A canal through East Potomac Park would give tour boats direct access to the Potomac River, cutting down on noise and pollution in the Washington Channel, and creating space for more recreational boats.

A Day in the Life

You live in Twining and work at a new office building on M Street, SE by the Washington Navy Yard. You usually ride your bicycle across the Pennsylvania Avenue Bridge, but it's a rainy morning. No problem; you can ride the waterfront light rail to work today. By bike or by light rail, it's just a 10-minute ride to work, door-to-door.

Artist's rendering of Pennsylvania Avenue, SE – Sousa Bridge with a new light-rail line and pedestrian access to the RiverParks.

